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EXAMINER	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAAKI BAIRO

Appeal 2009-010859
Application 10/584,994
Technology Center 2800

Decided: March 31, 2010

Before CARLA M. KRIVAK, ELENI MANTIS MERCADER, and CARL W. WHITEHEAD JR., *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Final Rejection of claims 9-15. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

INVENTION

Appellant's claimed invention is directed to a method for manufacturing a bipolar transistor wherein polycrystalline silicon is polished using a chemical mechanical polishing (CMP) process until an emitter electrode lead portion 40 and a base electrode lead portion 50 are separated from each other to achieve insulation. *See* Spec. 13:4-7; Figs. 5-6.

Claim 9, reproduced below, is representative of the subject matter on appeal:

9. A method for manufacturing a bipolar transistor, the method comprising the steps of:

forming a base layer on an insulator, said base layer being in contact with a portion of a semiconductor substrate;

forming an insulating film on said base layer;

forming base and opening electrode lead openings within said insulating film, said base electrode lead opening being formed simultaneous with said emitter electrode lead opening;

depositing a conducting film into said base electrode lead opening and into said emitter electrode lead opening, said conducting film within said base electrode lead opening being a base electrode lead portion and said conducting film within said emitter electrode lead opening being an emitter electrode lead portion; and thereafter,

polishing said conducting film to separate said base electrode lead portion from said emitter electrode lead portion.

THE REJECTION

The Examiner relies upon the following as evidence of unpatentability:

Hozumi	US 5,013, 677	May 7, 1991
Fujii	US 6,307,227 B2	Oct. 23, 2001
Besser	US 2003/0235984 A1	Dec. 25, 2003
Morimoto	US 6,885,081 B2	Apr. 26, 2005 (Sept. 8, 2003)

The following rejections are before us for review:

1. The Examiner rejected claims 9-13 under 35 U.S.C. § 103(a) as being unpatentable over Fujii in view of Hozumi and further in view of Morimoto.

2. The Examiner rejected claims 14-15 under 35 U.S.C. § 103(a) as being unpatentable over Fujii in view of Hozumi and further in view of Morimoto and Besser.

ISSUES

The pivotal issues are:

1. Does the combination of Fujii in view of Hozumi and Morimoto teach polishing a conducting film to separate the base electrode from the emitter electrode lead portion?

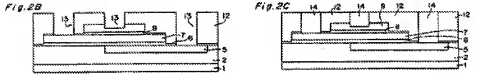
2. Does the combination of Fujii in view of Hozumi, Morimoto, and Besser teach depositing silicide instead of aluminum for contacts that are reliable, thermally stable, and have lower resistivity?

FINDINGS OF FACT (FF)

The following findings of fact are supported by a preponderance of the evidence:

1. Fujii teaches the presence of a bipolar transistor with separate base and electrode lead portions (Fig. 9; col. 8, ll. 27-30).

2. Morimoto's Figures 2B and 2C are reproduced below:



Figures 2B and 2C show that the via holes 13 and the tungsten films 14.

Morimoto discloses that titanium nitride (omitted in Figures 2B and 2C) and tungsten films 14 (Fig. 2C) are deposited on and in via holes 13 and then subsequently CMP polished to leave only plugs 14 in the via holes (col. 6, ll. 17-25; Fig. 2C).

3. Fujii teaches a first wiring layer formed of aluminum (col. 8, ll. 39-41).
4. Besser teaches that silicide contacts provide a number of advantages over contacts formed from aluminum because silicide contacts are reliable, thermally stable, and have lower resistivity (Besser ¶ [0003]).

PRINCIPLES OF LAW

The test for obviousness is what the combined teachings of the references would have suggested to the artisan. Accordingly, one can not show nonobviousness by attacking references individually where the

rejection is based on a combination of references. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

ANALYSIS

I. Claims 9-13

Appellant argues that Morimoto fails to teach surface polishing by the CMP method to separate one portion 14 from another portion 14 (App. Br. 7). Appellant further argues that Morimoto fails to teach the presence of a bipolar transistor, but rather, teaches a capacitor (App. Br. 7).

We are not persuaded by Appellant's arguments. We adopt the Examiner's findings of fact as our own (Ans. 8). Fujii teaches the presence of a bipolar transistor with separate base and electrode lead portions (FF 1). Fujii fails to teach how the base and electrode lead portions of the bipolar transistor are separated. Morimoto teaches polishing a conducting film to separate electrode lead portions for the benefit of forming individual plugs in via holes (FF 2). One cannot show non-obviousness by attacking references individually (i.e., Morimoto not teaching a bipolar transistor) where the rejections are based on combinations of references (i.e., Fujii teaches the bipolar transistor). *See Keller*, 642 F.2d at 426. In other words, Morimoto was used to show that the CMP method can be used to separate electrode lead portions. Therefore one of skill in the art would look to Morimoto's teachings to separate electrode leads.

We also agree with the Examiner's finding (Ans. 8) that the titanium nitride and tungsten films in Morimoto are deposited on and in the via holes 13 and then subsequently polished via a CMP process to leave only plugs 14 in the via holes (FF 2). Accordingly, Morimoto teaches surface polishing by

the CMP method to separate one electrode portion 14 from another electrode portion 14 formed in via holes 13 as clearly shown in Morimoto's Figure 2C.

For the foregoing reasons, we will affirm the Examiner's rejections of claim 9 and for similar reasons the rejections of claims 10-13 that fall with claim 9.

II. Claims 14-15

With respect to claim 14, Appellant argues (App. Br. 9-14) that none of the references teaches the limitation of: "depositing a silicide onto a polished surface of said conducting film." We are persuaded by Appellant's argument. The Examiner (Ans. 9) relied on Besser for substituting Fujii's first wiring layer formed of aluminum (FF 3) with silicide for the benefit of providing contacts that are reliable, thermally stable, and have lower resistivity (FF 4). However, Fujii does not teach depositing aluminum onto a polished surface of a conducting film. Accordingly, the references either alone or in combination lack the deposition step. Thus, we will reverse the Examiner's rejection of claim 14. For the same reason, we will also reverse the rejection of claim 15.

For the foregoing reasons, we will reverse the Examiner's rejections of claims 14 and 15.

CONCLUSIONS

1. The combination of Fujii in view of Hozumi and Morimoto teaches polishing a conducting film to separate the base electrode from the emitter electrode lead portion; and

2. The combination of Fujii in view of Hozumi, Morimoto, and Besser does not teach depositing silicide instead of aluminum for contacts that are reliable, thermally stable, and have lower resistivity.

ORDER

The decision of the Examiner to reject claims 9-13 is affirmed and the rejection of claims 14-15 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

gvw

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